

spores of this serious tree pest. A third paper<sup>5</sup> on this general subject has also been published, and it establishes the fact that insects are important carriers of the blight. "In proportion to size" say the authors, "insects may carry a greater number of spores of the blight fungus than birds. We are led to the conclusion that some insects . . . are important agents in the local dissemination of this disease."

These findings make it certain that no large part of the responsibility for spreading chestnut blight can be placed upon birds, for it is evident that bird vectors are far from indispensable to a pest that has at its service, innumerable insects, and the ubiquitous wind.—W. L. M.

#### **Economic Ornithology in Recent Entomological Publications.—**

The army worm (*Cirphis unipuncta*) is one of those pests of agriculture which appear in large numbers, now here, now there, but which in spite of the sporadic nature of their outbreaks wreak the most serious damage. Never has an infestation of army worms been studied without yielding evidence of the importance of bird enemies of the pest. Mr. H. H. Knight, of Cornell University, who investigated the army worm during the 1914 outbreak in New York, gives the following commendation<sup>1</sup> of the birds: "Certain species of birds were very numerous in fields infested with army-worms. One large hay field, situated on low ground and in the proximity of timber, was frequented daily by a large flock of crows. The crows destroyed the worms so fast that the field never became brown as was the case in all other infested meadows. Flocks of cowbirds and grackles were doing good work in some fields. The meadow lark and the robin were also observed eating the larvae."

In a Farmers' Bulletin<sup>2</sup> giving a general discussion of the army worm, Mr. W. R. Walton, remarks that: "Most fortunately for the farmer, the army worm has many natural enemies among the native insects, reptiles, birds, and mammals . . . . According to the records of the United States Biological Survey, more than 40 species of native wild birds are known to eat the army worm in its various stages. Among the most important of these are the following: Crow Blackbird or Grackle, Yellow-headed Blackbird, Chipping Sparrow, Bluebird, Prairie Hen, and European Starling. Domestic Fowls of all kinds will greedily devour the caterpillars and pupæ if allowed to roam over infested fields. Skunks and toads also undoubtedly eat thousands of the army worms, both caterpillars and pupæ. These birds and other animals should therefore be encouraged and protected by the farmer by all possible means."

Damage by the clover leaf-hopper, due to the small size of the pest which is overlooked, is usually attributed to soil or climatic deficiencies. It is really considerable, however, and it is fortunate that natural enemies

<sup>1</sup> The army-worm in New York in 1914, Bull. 376, Cornell Univ. Agr. Exp. Sta., May, 1916, p. 763.

<sup>2</sup> No. 731, U. S. Dept. Agr., May 23, 1916, pp. 9-10.

of the pest make up to some extent for the almost complete omission of measures of control. It is said <sup>1</sup> that:

"The insect enemies of the clover leafhopper seem to be few. Birds appear to be the most important enemies, and among the common species known to eat various species of leafhoppers in numbers are the Nuthatches, Yellow Warbler, Blue-headed Vireo, Long-billed Marsh Wren, Nighthawk, Phoebe, Tree Swallow, Bank Swallow, and Chickadee. In addition to these, over a hundred species of wild birds are known to feed upon leafhoppers. These birds should receive protection at the hands of the farmer."

The author of the foregoing extract has also recently published <sup>2</sup> on the corn and cotton wireworm (*Horistonotus uhleri*), a seriously destructive pest in the eastern half of the United States. It appears that in this case also "comparatively few natural enemies of this wireworm have been noted. No internal parasites have been reared from any stage of the species. Birds feed upon all kinds of wireworms, including those of the genus *Horistonotus*."

From a Florida publication <sup>3</sup> we learn that birds are appreciated aids in controlling the only serious insect enemy of velvet beans. "The caterpillars have many natural enemies. One of the most important is the 'Rice bird,' also called 'blackbird,' or 'red-and-buff-shouldered-marsh-blackbird.' These collect in great flocks in infested fields. Other birds, especially Mocking-birds, eat many of the caterpillars. It is probably on account of birds alone that small patches of velvet beans planted near woods usually escape with little injury."

Since birds are more or less indiscriminate in their attacks upon insects, beneficial species, as well as injurious, suffer from their predations. Brief comment upon a case of this kind is included by V. L. Wildermuth in his recent account <sup>4</sup> of the California green lacewing fly (*Chrysopa californica*). This neuropterous insect preys upon scale insects, plant lice, leaf-hoppers, and other injurious species and is held to be of real economic value. With regard to its bird enemies, the writer says:

"According to the records of the Biological Survey, United States Department of Agriculture, the Western wood pewee (*Contopus richardsonii*) feeds upon the species at Pasadena, Cal.; and at East Bernard, Texas, the nighthawk (*Chordeiles virginianus*) was found feeding upon the species, the stomachs of two birds containing three and six adults, respectively."

In judging birds in relation to useful insects, it must be borne in mind that a bird may take at a single meal as many insect pests as the insect

<sup>1</sup> Gibson, E. H., Farmers' Bull. 737, U. S. Dept. Agr., June 26, 1916, p. 5.

<sup>2</sup> Farmers' Bull. 733, U. S. Dept. Agr., June 9, 1916, p. 5.

<sup>3</sup> Watson, J. R., Control of the velvet bean caterpillar, Bull. 130, Fla. Agr. Exp. Sta., June, 1916, pp. 56-57.

<sup>4</sup> Journ. Agr. Research 6, No. 14, July 3, 1916, p. 524.

predator consumes during its whole life. Where the food species are essentially the same from an economic point of view, it would seem that the value of a greater predator is not impaired by its feeding upon a lesser.—W. L. M.

**Publications on Bird and Game Preservation.**—The constantly increasing number of educational publications dealing with the study and protection of our wild life is a most welcome sign of the general awakening of the public to the importance of this work. Among the journals before us 'The Blue Bird' continues to stand as a model for local Audubon or bird lovers organizations. Recent numbers contain among other articles a sketch of the Meadow Lark by Edwin L. Jack (April), 'The Genii of the Garden' [Robin and Chipping Sparrow], by Cordelia J. Stanwood (May), and 'The Hermit Thrush on its Nesting Ground' by Edwin L. Jack — all well illustrated. 'California Fish and Game' for July includes Teachers' Bulletin No. 7 on the control of the English Sparrow, a problem which is attracting widespread interest, 'Fin, Feathers and Fur' continues to keep Minnesota sportsmen and bird lovers posted on matters of interest. Louisiana contributes an excellent report of State Ornithologist Stanley C. Arthur in the 'Annual Report of the Conservation Commission of Louisiana' on bird protection in the State, while Mr. E. A. McIlhenny reports on game breeding on the State game farm. Mr. Earle A. Brooks, has prepared a notable report on 'The Food of West Virginia Birds' published by Hon. H. E. Williams, Commissioner of Agriculture. The whole question of the economic value of birds is treated in an attractive way backed by data from recognized authorities, and well illustrated.

Abroad, 'Bird Notes and News,' summer number 1916, tells of a revival of the attempt in England to pass the plumage importation bill while the 'Ornithologische Monatschrift' for May and June, 1915, which has just reached us, contains an extended article on bird song by Messrs. Stadler and Schmitt as well as the usual local notes. — W. S.

### The Ornithological Journals.

**Bird-Lore.** XVIII, No. 4. July-August, 1916.

Birds of Monument Valley Park, Colorado Springs, Colorado. By E. R. Warren.

A Home in the Forest. By Florence M. Bailey.—A Study of Nesting Sierra Creepers.

A Merganser Family. By May D. Lewis.—In the Adirondacks.

A Successful Bird Exhibit. By Frederick Greenwood.

Notes on the Plumage of North American Birds. By F. M. Chapman, with colored plate by Fuertes. Covers the Pipits and Dipper.

The Educational Leaflet treats of the Veery.